Ames Procedural Requirements

Compliance is Mandatory

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Ames Health and Safety Procedural Requirements

Chapter 27: Construction Safety Management

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27.1 Responsibilities

a. All persons who manage, perform, and provide support for construction work located on all property under the jurisdiction of Ames Research Center (ARC) shall conduct operations in compliance with the requirements identified in this chapter, all applicable governing regulatory agency regulations and agency guidelines pertaining to safety in construction.

b. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance. It is the responsibility of the Prime Contractor to coordinate work and prevent one subcontractor from interfering with or creating hazardous working conditions for another, to inspect subcontractor operations and ensure that accident prevention responsibilities are being carried out.

27.1.1 NASA Ames Safety, Health and Medical Services Division shall:

a. Provide construction safety oversight for construction and/or maintenance projects.

b. Provide Certified Asbestos Consultants for assessment and oversight of projects including maintenance activities that pose a potential or actual disturbance of materials that contain asbestos.

c. Provide California Department of Public Health - Certified Lead Professional, Project Monitor and Inspector, and Lead Risk Assessor for assessment and oversight of projects including maintenance activities that pose a potential or actual disturbance of materials containing lead.

d. Provide updates and information on construction safety regulatory changes to ARC, evaluate, and minimize their impact to the Center.

e. Ensure a thorough review and evaluation of all building permits prior to the start of construction projects.

f. Ensure a thorough review and evaluation of contractor safety plans and all associated documentation prior to the start of construction projects.

g. Support construction related mishap investigations.

h. Accompany all regulatory agency personnel, including OSHA inspectors, on all visits to construction sites.

i. Maintain a central location for all construction safety management documentation.
27.1.2 NASA Ames Construction Safety Specialist shall:

a. Be the primary health and safety contact for inspection and compliance pertaining to construction and maintenance related work activities.
b. Conduct regular job site inspections for compliance to NASA policies, all applicable governing regulatory agency laws and guidelines for construction and maintenance activities.
c. Notify responsible parties of safety hazards to initiate remediation on a job site for construction and maintenance activities.
d. Provide professional safety technical advice related to construction activity:
   (1) Review of contractor's safety submittals in accordance with the deliverables section of this document and associated safety documentation submitted to the COR to ensure compliance with OSHA and Ames Health and Safety Procedural Requirements.
   (2) Review construction permits to integrate complete and applicable safety requirements into safety plans, drawings, specifications and contractor or project documents during the design phase.
   (3) Review Contractor documentation on required health and safety "Weekly Tailgate Meetings".
   (4) Attend construction projects bid walks and preconstruction meetings to communicate safety expectations and provide guidance to the COR, project managers and contractor personnel.
   (5) Support construction related mishap investigations per requirements outlined in Ames Health and Safety Procedural Requirements: Chapter 4 - Mishap Reporting and Investigating.

e. Issue Unsafe Condition Noncompliance Notice (see appendix) to the COR and Contracting Officer when a documented deficiency has not been resolved in a reasonable amount of time.
f. Issue Stop Work Notice (see appendix) to the COR and Contracting Officer when a deficiency poses an imminent health and/or safety hazard.
g. Maintain a copy of all construction project documentation related to health and safety.
h. Conduct a job-site review of Hot Work permits that have been issued by the NASA Ames Fire Marshal's office.
i. Document inspections.

27.1.3 NASA Ames Research Center Health Unit shall:

Upon request, provide emergency medical treatment to construction workers who have experienced an acute injury or illness while working on Ames Research Center property.

27.1.4 NASA Ames Construction Manager, Project Manager shall:

a. Ensure that a survey to determine the presence, location, and quantity of asbestos and/or lead-containing materials has been conducted prior to any work performance, if
applicable see Ames Health and Safety Procedural Requirements: Chapter 30 - Asbestos
Management Plan; Chapter 35 - Lead Management Plan for additional information.
b. Ensure that all construction-related work activities are conducted in accordance with
NASA policies and all applicable regulations that pertain to construction safety. Include
requirements in construction contracts for safety performance and written safety plans.
c. Ensure that the "Construction Permit" is not issued until a safety specialist in the
appropriate field (i.e., Fire, Safety and Asbestos) approves the design plan.
d. Ensure legionella control features in water and ventilation systems, as stated in
ASHRAE 12-2000. Examples include avoidance of dead legs in water systems, effective
water temperature controls and proper placement of building air intakes.

27.1.5 NASA Ames Code JA, Acquisition Division shall:

a. Invoke the "Suspension of Work" provision of the contract should the Contractor or
subcontractors refuse or fail to ensure prompt corrective action of safety deficiencies.
b. Review past safety performance prior to Contractor selection including incident rates,
lost time accidents and Experience Modification Rate (EMR).
c. Notify the Ames Safety, Health and Medical Services Division when the selected
contractor has an EMR above 1.25.

27.1.6 NASA Ames COR, Construction Manager shall:

a. Ensure that every construction project has a designated Construction Manager and/or
Project Manager that is trained in NASA and OSHA standards applicable to contracts and
construction and receives refresher training periodically. Initial training equivalent to thirty
(30) classroom hours on construction safety that includes regulations in 29 CFR 1926 or
California's Construction Safety Orders in CCR Title 8 will satisfy this requirement. The
COR should receive similar training.
b. Submit contractor safety plans, authorized work plan and all associated documentation
to the Construction Safety Specialist for review.
c. Ensure that construction contractors implement an injury prevention policy and comply
with the provisions of the approved construction safety plan and associated
documentation.
d. Ensure that all construction related work activities are conducted in accordance with
NASA policies and all applicable regulations that pertain to construction safety.
e. Cultivate a communication partnership with the ARC Construction Safety Specialist to
ensure:
   (1) Monitoring of construction related work and maintenance activities.
   (2) Participation in bid walks, pre-construction and weekly progress meetings.
f. Provide notification to all affected building occupants before any construction work
begins in occupied buildings.
g. Ensure that only NASA Environmental Division designated personnel sign hazardous
waste manifest(s).
h. Coordinate confined space activities as required in the Ames Health and Safety Procedural Requirements: Chapter 26 - Confined Space Entry.

i. Ensure that existing utilities (e.g., electrical, gas, steam) requiring shutoff are identified and a lockout/tagout plan has been established.

27.1.7 Construction Contractors shall:

a. Comply with the provisions of the approved construction safety plan and associated documentation.

b. Exercise supervisory authority over all construction activities. Comply and require all subcontractors to comply with NASA construction safety requirements and all applicable regulations that pertain to construction and safety.

c. Conduct daily job-site safety inspections and document the inspections utilizing the Construction Safety Inspection form (see appendix) or equivalent.

d. Ensure that all employees are competent and trained or appropriately certified for the activities they are conducting per NASA and OSHA requirements.

e. Ensure that all employees are fully aware of the hazards associated with the project.

f. Ensure that the contractor or subcontractor who created or controls the hazard immediately abates health and safety hazards at the worksite.

g. Designate a Site Safety and Health Officer (SSHO) with assurance responsibility for safe work procedures and authority to correct unsafe conditions. See the Personnel and Qualifications section of this chapter for additional information.

h. Ensure the SSHO is onsite at all times when work is being conducted. This includes when subcontractors are performing work onsite.

i. Notify the Contracting Officer Representative (COR) immediately upon discovery of any health and safety deficiency that the contractor cannot resolve.

j. Notify the COR immediately upon discovery of an inspection by regulatory agency personnel, including OSHA.

k. Notify the Contracting Officer as soon as practical after an accident or mishap.

l. Ensure that the Contracting Officer Representative (COR) has authorized safety work plans and documentation before work begins. Alternatively, for very small or short duration projects, a signed copy of the contractor’s Code of Safe Work Practices may satisfy this requirement. In the absence of the above, immediately contact the COR. See the Submittals section of this chapter for additional information.

m. Ensure that no deviation from the approved health and safety submittals occur without the approval of the COR. Notify the CO, Ames Construction Safety Specialist and COR in writing with any revised safety submittals.

27.1.8 Site Safety and Health Officer (SSHO):

a. The SSHO shall:
1. Be on-site during all times when work is being performed. Absence is considered non-compliance.
2. Be in a position of authority to take corrective action measures to abate safety issues on the jobsite.
3. Perform daily jobsite safety inspections and complete checklists.
4. Have completed inspection checklists available onsite.

27.2 Worksite Procedures

27.2.1 Utility Pre-outage Coordination
a. Construction Contractors shall comply with the following:
   1. Apply for utility outages in writing through the COR, Project Manager or Construction Manager at least ten (10) working days in advance. Include the location of the outage, duration of outage, any necessary sketches and information that clearly identifies the circuits or system requested to be turned off.
   2. Attend a pre-outage coordination meeting with the COR, Project Manager or Construction Manager that includes the installation or utility representative. The meeting is held after the request has been approved in writing and prior to beginning work on the utility system. The purpose of the meeting is to review the scope of work and the lock-out/tag-out procedures for worker protection.
   3. Only perform work on de-energized electrical circuits.

27.2.2 Hazard Control
a. The contractor shall ensure:
   (1) Worksite hazards are adequately controlled to prevent injury and illness. Provide pre task planning, job site training, inspections, hazard identification, hazard controls, management commitment to eliminate hazards, on-site authority to remedy recognized hazards and adequate records documentation. The Prime Contractor is responsible for ensuring subcontractor compliance with the safety and occupational health requirements.
   (2) In the event that any severe hazard exposure or imminent danger becomes evident, stop work, secure the area, then develop a plan to safely remove the exposure and control the hazard. Take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSE/SAFE A10.34) and the environment.

27.2.3 Protection of the Public and Federal Employees

Work shall not be performed in any area occupied by the public or federal employees unless specifically permitted by the contract or Contracting Officer. Adequate steps must be taken for the protection of the public or federal employees at all times. See Ames Health and Safety Procedural Requirements: Chapter 30 - Asbestos Management Plan
27.2.4 Accident Scene and Notification
a. Call 650-604-5555 for emergency medical and fire response.
b. Notify the Ames Safety, Health and Medical Services Division immediately at 650-604-5602.
c. Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted.
d. Do not allow personnel to leave the scene or discuss details before formal interviews have been completed by Government investigation team.
e. Notify the Contracting Officer as soon as practical, but not later than one (1) hour after a hospitalization, fatality, $1 million loss or high visibility incident. See the Accident Scene and Notification section of this chapter for additional information. File electronic Quick Report at http://q.arc.nasa.gov/IncidentReporting.html within twenty-four (24) hours.
f. Notify the Contracting Officer as soon as practical, but not later than four (4) hours after other accidents meeting the definition of Recordable Injuries or Illnesses, property damage equal to or greater than $1,000, Close Calls, or any weight handling equipment accident in accordance with NASA NPR 8621.1B. See the Accident Scene and Notification section of this chapter; Ames Health and Safety Procedural Requirements: Chapter 4 - Mishap Reporting and Investigating for additional information. File electronic mishap report at https://nmis.sma.nasa.gov within twenty-four (24) hours.
g. Within notification include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.).

27.3 Forms, Notices and Permits

27.3.1 Display of Safety Information
a. Within one (1) calendar day after commencement of work, erect a safety bulletin board at the job site.
b. Posted items are required to be durable in order to withstand the outdoor elements such as rain and sun or replaced frequently so they remain legible.
c. Where size, duration, or logistics of project do not facilitate a bulletin board, an alternative method acceptable to the Contracting Officer that includes all mandatory information for employee and visitor review shall be deemed as meeting the requirement for a bulletin board.
d. Items posted on the bulletin board shall include:
   (1) Confined space entry permit.
   (2) Hot work permit.
(3) Excavation permit.
(4) Federal and California OSHA posters.
(5) Emergency information such as numbers to call for emergency assistance, name and location of designated medical facility.
(6) Contact information of key NASA and Contractor personnel working on the project.
(7) Code of safe practices, AHA’s or post location where they can be found, site specific plan.

27.3.2 Construction Safety Inspection Form

a. Utilize the inspection form provided in the appendix or equivalent.
b. Have these forms available on the jobsite.

27.3.3 Unsafe Condition Noncompliance Notice

a. The NASA Ames Construction Safety Specialist shall:

Issue an Unsafe Condition Noncompliance Notice for an unsafe condition or for noncompliance. Deliver personally or electronically to the COR, Contracting Officer, and the Construction Program Manager for the Safety, Health and Medical Services Division. See appendix for sample. See Appendix E, Unsafe Condition Noncompliance Notice.

27.3.4 Stop Work Order Notice

a. The NASA Ames Construction Safety Specialist shall:

(1) Issue a Stop Work Order Notice if imminent danger or repeated unsafe condition.
(2) Deliver personally or electronically to the COR, Contracting Officer, and the Construction Program Manager for the Safety, Health and Medical Services Division. See Appendix F, Stop Work Order Notice.

27.3.5 Hot Work Permit

The Contractor Shall Obtain and Post:

A written permit at job site prior to performing "Hot Work" or operating other flame/spark producing devices (welding, cutting, powder actuated tools, tar pots, etc.) from the NASA Ames Fire Prevention Office located in Building 158 Room 202 at 650-604-2024 or 650-604-3112. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. See the Hot Work section in this chapter for additional information.
27.3.6 Excavation Permit

The Contractor Shall Obtain and Post:

A written permit at job site prior to performing excavation of six (6) inches or deeper from Ames Facilities Maintenance at 650-604-2960. See the Trenching and Excavation section of this chapter for additional information.

27.4 Personnel and Qualifications

27.4.1 Site Safety and Health Officer (SSHO)

The SSHO shall:

a. Be a Competent or Qualified Person as per 27.4.2 of this section.
b. Have completed the thirty (30) hour OSHA 510 - Standards for Construction Industry or equivalent course.
c. Have additional specialized safety training to effectively recognize and correct additional site specific hazards such as fall protection Competent Person, Scaffolding Competent Person and other required training that OSHA 30 hour training does not cover.
d. Maintain SSHO competency through twenty-four (24) hours of formal safety and health related coursework every four (4) years.
e. Have a minimum of one (1) year safety related work experience.
f. For small, short duration construction contracts, both the Contracting Officer and the Ames Safety, Health and Medical Services Division may modify SSHO requirements:
g. The minimum requirement in this instance will be OSHA 10 hour training along with any other required specialized safety training and experience.
h. May be a tradesman, but will have the position of authority as indicated in this section 27.1.8.

27.4.2 Competent or Qualified Person

Competent or Qualified Person shall:

a. Be available for all hazardous work identified in the Contractor's safety plan and in accordance with OSHA.
b. Be onsite at all times when work associated with their professional expertise is being performed.
c. The Contracting Officer, in consultation with the Ames Construction Safety Specialist, will review and approve Competent or Qualified Person credentials.
d. The Prime Contractor is responsible for ensuring subcontractor compliance with the Competent or Qualified Person requirements.

27.5 Submittals

Submit plan(s) and reports to the COR fifteen (15) calendar days prior to on-site work or as noted in this section.
27.5.1 Corporate Injury Illness Prevention Program (IIPP)

a. Required for every contractor and sub-contractor working at NASA Ames. Work cannot proceed without an accepted IIPP. Additional information and detailed requirements for the IIPP can be obtained online from the California Division of Occupational Safety and Health (DOSH). [http://www.dir.ca.gov/dosh](http://www.dir.ca.gov/dosh) or [http://www.dir.ca.gov/dosh/dosh_publications/iipp.html](http://www.dir.ca.gov/dosh/dosh_publications/iipp.html)

b. The Corporate IIPP shall include the following elements in sufficient detail:

1. Management commitment/assignment of responsibilities.
2. Safety communications system with employees.
3. System for assuring employee compliance with safe work practices.
4. Scheduled inspections/evaluation system.
5. Accident investigation.
6. Procedures for correcting unsafe/unhealthy conditions.
7. Safety and health training and instruction.
8. Recordkeeping and documentation.
10. Periodic safety meetings with management.
11. Toolbox safety meetings with work crew.

27.5.2 Site Specific Safety Plan (supplement to IIPP)

a. Required for every contractor and sub-contractor working at NASA Ames. Work cannot proceed without an accepted Site Specific Supplement that augments with the Corporate IIPP.

b. The Safety Plan shall include the following elements in sufficient detail:

1. Names and qualifications of all personnel designated to perform work on this project.
2. Certification or Proof of training for each qualified and competent person.
3. Proof of training for Site Safety and Health Officer (SSHO).
4. Identify and list all unusual or high-hazard activities specific to the project and provide AHA’s for those uncontrolled hazards where written plans such as confined space entry and fall protection are not already provided.
5. Provide two (2) Toolbox safety meeting topics with detail for jobs planned to last more than one week that will be used during the project. Topics should relate to hazards that employees will encounter.

c. Continuously review and amend the Safety Plan as necessary throughout the life of the contract. Provide copies of revised supplement to the COR and Ames Construction Safety Specialist.
27.5.3 Activity Hazard Analysis (AHA) or Job Hazard Analysis (JHA)
a. Activity Hazard Analysis is a technique that focuses on job tasks as a way to identify hazards before they occur. The AHA focuses on the relationship between the worker, the task, the tools, and the work environment. After you identify uncontrolled hazards, you will take steps to eliminate or reduce them to an acceptable risk level.
b. Activity Hazard Analysis is similar to a Job Hazard Analysis (JHA).
c. Required for every contractor and sub-contractor working at NASA Ames. An AHA shall be completed for each unusual or high-hazard activity on the job site that is uncontrolled (where written plans such as confined space entry and fall protection are not already provided). Work cannot proceed without approved AHA's. Additional information and a sample AHA can be found in the appendix.
d. Identification of hazards. A hazard is the potential for harm. If left uncontrolled, a hazard could result in injury or harm. A hazard can be a physical object, chemical, noise, radiation, extreme heat or cold, electrical energy or anything else that has the potential to cause harm.
e. Must be posted on job board to be made available to employees for reference at all times during work.

27.5.4 Confined Space Entry Plan
a. Use a qualified person to prepare a confined and/or enclosed space entry plan in accordance with Ames Health and Safety Procedural Requirements: Chapter 26 - Confined Space Entry, applicable OSHA standards 29 CFR 1910, 29 CFR 1926, OSHA Directive 2.100, and any other federal, state and local regulatory requirements identified in your contract. The most stringent requirements govern when inconsistencies arise. All confined space permits must be submitted Building N237, Office 103 the Safety Office, Mail Code 237-14.
b. Required for every contractor and sub-contractor working in confined spaces at NASA Ames.
c. Confined Space Entry Plan must:
   (1) Identify the qualified person's name, qualifications, training and experience.
   (2) Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions.
   (3) Include procedure for rescue by contractor personnel and the coordination with emergency responders.

27.5.5 Excavation Plan
a. Use a qualified person to prepare and sign a written Excavation Plan that is site specific.
b. The Excavation Plan must:
   (1) Address any fall hazards during different phases of construction.
   (2) Identify trench and shoring systems.
   (3) Include tabulated data and specifications or registered engineer tabulated data for shoring or benching systems and be readily available on-site for review.
Include registered professional engineer stamp, specifications, and tabulated data for Job-made shoring or shielding and be readily available on-site for review.

Include scope of work, start and end date, exact location of the excavation, name and contact information of the competent person, excavation details (depth, soil type, adjacent structures such as roadways, etc.), cave-in protection to be provided, access, egress, air sampling, platforms, ramps, information on underground construction other than trenching, means to control water accumulation in the excavation, means to protect pedestrians and vehicular traffic from excavations.

c. Also see the Trenching and Excavation section of this chapter.

27.5.6 Fall Protection Plan

a. Use a qualified or competent person per ANSI/ASSE Z359.2 to prepare and sign a written Fall Protection Plan that is site specific and meets the minimum requirements for a comprehensive managed Fall Protection program.

b. The Fall Protection Plan must:

1. Address any fall hazards in the work place during different phases of construction.

2. Address how to protect and prevent workers from falling to lower levels.

3. Include responsibilities, equipment and methods employed, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods.

c. See Ames Health and Safety Procedural Requirements: Chapter 40 - Fall Protection Program for additional information.

27.5.7 Radioactive Material Use Submittals

a. Submit radioactive material license to the COR and Radiation Safety Officer (RSO) 650-604-4548 or 650-604-3979 (Ames Safety, Health and Medical Services Division, N237 room 108) for all use of radioactive materials and equipment at NASA Ames Research Center. Submit at least five (5) business days prior to bringing radioactive material on site.

b. If the radioactive material license is issued by the state of California or any other state, the license submittal shall be accompanied by an approved NRC Form 241. Note that the NRC requires a minimum of 3 days to process and approve the NRC Form 241.

c. Provide the RSO with a copy of the firm's radiation safety manual at least five (5) business days prior to bringing radioactive material on site.

d. Submit copies of all required certifications to perform work with radioactive material and ionizing radiation sources (e.g. IRRSP certification for radiographers) at least five (5) business days prior to bringing radioactive material on site.

e. For performing Industrial Radiography, submit a completed “Notification of Radiography” form and “Notice of Radiation Testing” form to the Radiation Safety Officer or the Assistant Radiation Safety Officer at least two (2) working days prior to intended
dates of radiography. Contact the Radiation Safety Officer to receive copies of these forms.

f. See section 27.15 in this chapter for specific radiation safety requirements.

27.5.8 Laser Safety Plan

a. Submit safe operating procedures for use of any Class 3B and Class 4 lasers to the COR and Laser Safety Officer 650-604-4548 or 650-604-3979 (Ames Safety, Health and Medical Services Division, N237 room 108). Submit this application at least ten (10) working days prior to intended laser operations for indoor laser use and forty-five (45) days prior to laser operations for outdoor use.

b. For outdoor use of all classes of lasers (Class: 1, 1M, 2, 2M, 3R, 3B, and 4): submit a FAA form 7140-1 “Notice of Proposed Outdoor laser Operations” to the COR, Laser Safety Officer and Airfield Manager. FAA approval can take up to forty-five (45) days.

c. See section 27.15 in this chapter for specific laser safety requirements.

27.5.9 RF/Microwave Safety Plan

a. Submit safe operating procedures for use of high power RF/Microwave transmitting devices (does not include universal low intensity devices such as cell phones, Wi-Fi devices, and walkie-talkies) to the Nonionizing Radiation Safety Officer 650-604-4548 or 650-604-3979 (Ames Safety, Health and Medical Services Division, N237 room 108). Submit this form at least five (5) working days prior to use.

b. See section 27.15 in this chapter for specific RF/Microwave safety requirements.

27.5.10 Crane Reports

Submit crane inspection reports to the COR.

27.5.11 Crane Lift Plan

a. Use a qualified person to prepare and sign a written Crane Lift Plan that is site specific. See Ames Health and Safety Procedural Requirements: Chapter 17 - Lifting Devices and Equipment; NASA-STD-8719.9 - Standard for Lifting Devices and Equipment; Lifting Devices section of this chapter for information.

b. Submit crane company safety plan and provide it at the lift site.

c. Submit Licensed Operator (NCCCO) Certification to the COR.

d. Submit Rigger and Signal Person Certifications to the COR.

e. Submit Site Specific Crane Lift Plan to the Center's Lifting Device Equipment Manager (LDEM) 5 business days prior to lift.
27.5.12 Crane Critical Lift Plan

a. Use a qualified person to prepare and sign a weight handling critical lift plan where the following conditions are present:

1. When failure/loss of control could result in loss of life, loss or damage to flight hardware.
2. When major facility components whose loss would have serious programmatic or institutional impact.
3. Lifting personnel with a crane, lifts where personnel are required to work under a suspended load, and operations with special personnel and equipment safety concerns beyond normal lifting hazards.

b. For lifts of personnel, demonstrate compliance with the requirements of 29 CFR 1926.1400.

d. Submit Licensed Operator NCCCO/Rigger Certifications.

27.6 Construction Site Reference Materials

Maintain project related reference materials and make them available to all personnel working at the job site. Include applicable equipment manufacturer’s manuals and safety related information to protect employees.

27.7 Obstructions

a. Contractors, construction activity and maintenance operations shall not:

1. Obstruct a corridor, aisle, stairway, door, or exit in such a manner as to encroach on routes of ingress or egress utilized by the public or building occupant.
2. Obstruct access to fire protection panels and equipment.
3. Obstruct or close streets, walks, and other facilities occupied and used by the Government without written permission from the Contracting Officer.

27.8 Temporary Traffic Disruption

Construction or maintenance operations that disrupt traffic must:

1. Use trained flaggers to achieve safe traffic flow.
2. Maintain training documentation for personnel on site.
4. Post traffic control signs and install traffic barriers per CMUTCD Part 6, Temporary Traffic Control.

27.9 Fences and Barricades

a. Provide, erect, and maintain lights, barriers, signals, passageways, detours, and other traffic-control items that may be required for protection of the public.
b. Contractor shall ensure that the work area:

1. Is fenced, barricaded or otherwise blocked off from the public and building occupants to prevent unauthorized entry into the work area. The minimum construction standard for interior temporary barriers consist of floor-to-ceiling and wall-to-wall metal studs 400 mm on center anchored top and bottom, covered with a minimum of one layer 15 mm gypsum wallboard.
2. Maintains access to fire hydrants and fire department connections. Coordinate with NASA Security and the NASA Ames Fire Department prior to erecting fences and barricades.
3. Has fences and barricades removed upon completion of the project.

c. Caution tape or alternate methods may only be used to secure a construction site with the approval of the Ames Construction Safety Specialist.
d. Obtain approval from COR at least 72 hours in advance of starting any activity that will obstruct traffic.
e. Provide qualified flag personnel for traffic control when roadways are obstructed during normal working hours, and provide lighted barricades in appropriate locations at roadways obstructed beyond normal working hours.

27.10 Hot Work

a. Personnel performing hot work or operating other flame/spark producing devices (welding, cutting, powder actuated tools, tar pots, etc.) shall:

(1) Obtain a written permit from the Ames Fire Prevention Office at 650-604-2024 or 650-604-3112. Post the permit at the jobsite prior to performing any hot work. CONTRACTORS ARE REQUIRED TO MEET ALL CRITERIA BEFORE A PERMIT IS ISSUED. See appendix C for permit example.
(2) Provide forty-eight (48) hour notice to Ames Facilities Maintenance at 650-604-2960 prior to any hot work permit that would otherwise affect the fire access panel, or fire and life safety system within any building.
(3) Provide at least two (2) twenty (20) pound "ABC rated" extinguishers for normal hot work at each source with current inspection tag, approved safety pin and tamper resistant seal.
(4) Provide a designated Fire Watch (an individual with appropriate training and experience) for any hot work in accordance with NFPA 51B and remain on-site for a
minimum of 30 minutes after completion of the task or as specified on the hot work permit.

(5) Review location of the nearest fire alarm boxes and emergency services dispatch phone number 650-604-5555 with personnel when starting hot work in the facility.


b. Questions regarding a fire, post emergency response/reporting should be directed to the Ames Fire Marshal at 650-604-4302.

27.11 Trenching and Excavation

a. Obtain and post a written permit from Ames Plant Engineering at (650) 604-2960 prior to performing excavation of six (6) inches or deeper. Post the permit at the jobsite before any excavation work.

b. Trenching and excavation personnel shall:

(1) Strictly comply with 29 CFR 1926 Subpart P in its entirety, Subpart S (1926.800 - Underground Construction) and Subpart V (1926.956 - Underground lines).

(2) Have a Competent Person perform soil classification and provide site control in accordance with 29 CFR 1926.

(3) Have all underground utilities in the work area positively identified by a private utility locating service in addition to any station locating service.

(4) Coordinate with NASA Ames in addition to a private locating service whenever contract work involves concrete chipping, saw cutting, or core drilling. Reinforcing steel used in concrete construction makes utility lines extremely difficult to identify.

(5) Use outages to isolate utility systems in circumstances where utilities are unable to be positively identified. The use of historical drawings does not alleviate the contractor from meeting this requirement.

(6) Hand dig using wood or fiberglass handled tools when any adjacent construction work is expected to come within three (3) feet of an underground system or known utility. If construction is parallel to an existing utility, expose the utility by hand digging at several locations.

(7) De-energize underground high voltage prior to pneumatic or machine powered excavation or subsurface demolition activities in vicinity.

(8) Obtain underground ground penetrating radar, sonar, or equivalent scanning type survey to locate and mark ground for all buried utilities and electrical conduits whenever high voltage is suspected to be near planned digging.

(9) Only operate trenching machines with digging chain drives when the spotters/laborers are in plain view of the operator.

(10) Be trained on the hazards of digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating.

(11) Follow requirements in the section of this chapter titled: Gas Protection.

27.12 ARC Flash Labels
a. Construction Contractors shall:

(1) Provide warning labels per NEC section 110.16 and 29 CFR 1910.335(b) (1), for electrical equipment installed.
(2) Post label conspicuously on or near the equipment that states "WARNING -- Arc Flash and Shock Hazard -- Appropriate PPE Required."
(3) Post label to provide additional information described in NFPA 70E indicating: flash hazard boundary, calories per square centimeter, personal protective equipment level, kilovolt shock hazard when cover is removed, limited approach distance, restricted approach distance and prohibited approach distance.

27.13 Severe Storm Plan

a. In the event of a severe storm warning, the Construction Contractor shall:

1. Secure outside equipment and materials and place materials that could be damaged in protected areas.
2. Check surrounding area, including roof, for loose material, equipment, debris, and other objects that could be blown away or against existing facilities.
3. Ensure that temporary erosion controls are adequate.

27.14 Confined Space Entry

Personnel entering and working with confined spaces shall:


b. Follow requirements in the section of this chapter titled: Gas Protection.

c. Notify the NASA Ames Fire Department prior to entry to assure rescue operations are available and after entry has been completed by calling 650-603-8596.

d. Obtain an entry permit from the Ames Safety, Health and Medical Services Division, 650-604-5602. The form is at http://server-mpo.arc.nasa.gov; via NEF window, obtain ARC Form 230.

e. Enter data for each element on the form.

f. Upon work completion, send the completed permit to the Ames Safety, Health and Medical Services Division, ATTN: Administrative Assistant M/S 237-14, Bldg. 237.

g. Prohibit entry into a confined space by personnel for any purpose, including hot work, until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the work intended and that all potential hazards are controlled or eliminated and documented.
h. Review all hazards pertaining to the space with each employee prior to entry.
i. Develop and review a confined space rescue plan with all personnel involved in the entry prior to entry.
j. Use forced air ventilation for all confined space entry operations and maintain the minimum air exchange requirements to ensure exposure to any hazardous atmosphere is kept below its action level.
k. Maintain constant communication between workers inside the space and outside the space.
l. Require continuous atmosphere monitoring with audible alarm for toxic gas detection inside the confined space while workers are present.
m. Maintain current training in CPR/AED and First Aid for the attendant position.

27.15 Radiation and Laser Safety

a. The use of radioactive material sources, ionizing radiation producing machines, particle accelerators, lasers, or high power radiofrequency/Microwave transmitters for construction activities are only permitted to be used on Ames Research Center property with the consent of the NASA Ames Radiation Safety Officer.
b. The most common construction related activities involving radiation/radioactive material that require authorization include but are not limited to the following:
   (1) Industrial Radiography.
   (2) Soil Compaction testing utilizing a nuclear density gauge.
   (3) Handheld X-ray fluorescence analyzers using either an x-ray tube or gamma source.
c. The most common construction related activities involving nonionizing radiation sources that require authorization include but are not limited to the following:
   (1) Laser Range Finders.
   (2) Laser scanners.
   (3) Microwave and Radio Frequency transmitters and radar (not including universal low intensity items such as cell phones, Wi-Fi devices, and walkie-talkies).

27.15.1 Radioactive Materials and Radiation Producing Equipment

a. The construction contractor shall:
   (1) Maintain copies of the documentation listed in the submittals section on the jobsite at all times.
Perform all radiation testing in compliance with radiation safety requirements set forth in 10CFR20.

Transport radioactive materials in accordance with DOT radioactive material transport regulations listed in 49 CFR 172-173.

Lock and secure radioactive materials when not in use.

Immediately report to the Radiation Safety Officer and the Contracting Officer any radiological health hazard, emergency, or loss of ionizing radiation source at the center.

Comply with 8715.1 Chapter 8 requirements concerning the use of transmitters.

Consent to radiation safety audits by the Radiation Safety Officer or designee at any time.

b. The construction contractor shall perform the following additional requirements when performing industrial radiography:

(1) Ensure that “Notice of Radiation Testing” postings are placed at all entrances to all buildings affected by the radiography at least 24 hours prior to the time of radiography.

(2) Ensure that Division Managers, Branch Chiefs, CORs, contractors, and other managers of any affected facility are notified at least 24 hours prior to the radiography to assure that any disruptions to their operations are understood. The notification informs them that affected areas will need to be clear of all personnel for the timeframe of the radiography.

(3) Ensure that Moffett Field Dispatch is notified of building access restrictions and any blocked roadways that could impact potential emergency service efforts prior to commencing radiography. Also ensure that Moffett Field Dispatch is notified when access restrictions are lifted following the radiography.

(4) Ensure that radiographic operations are only conducted between the hours of 5pm and 5am on normal business workdays. Radiographic operations conducted during daytime hours are only permitted during holidays and weekends.

(5) Ensure that radiographic operations do not commence until the radiation safety officer or designee has performed a radiation safety audit to ensure compliance with all requirements set forth in 10 CFR 34.

(6) Perform non-destructive testing in accordance with NAVSEA Technical Publication T9074-AS-GIB-010/271 "Requirements for Non-destructive Testing Methods,” modified by deletion of all reference to Bureau of Ships and other Navy agencies and substitution of “NASA” and Nuclear Regulatory Commission (NRC) NUREG/BR-0024 for radiographies using NRC licensed radioactive materials unless otherwise approved.

(7) Notify the COR upon completion of radiological operations.

(8) Ensure all radiological postings and boundaries are removed from the affected buildings.
27.15.2 Laser Safety Requirements for Indoor and Outdoor Use

a. Contact the NASA Ames Nonionizing Radiation Safety Officer for any questions about policies and to obtain the procedure templates and forms required to perform the following activities. The Nonionizing Radiation Safety Officer can be reached at 650-604-3979 and the Asst. Nonionizing Radiation Safety Officer at 650-604-4548.

b. The construction contractor shall ensure the following requirements are met for indoor use of Class 1, Class 1M, Class 2, Class 2M, or Class 3R lasers or laser systems.
   (1) Use of these lasers will be in accordance with the latest revision of ANSI/LIA Z136.1, "American National Standard for Safe Use of Lasers."
   (2) Posting that is compliant with ANSI/LIA Z136.1 will be used when exposure to lasers is possible to personnel other than the users of the lasers.

c. The construction contractor shall ensure the following requirements are met for indoor use of Class 3B or Class 4 lasers.
   (1) Specific written operating procedures including alignment procedures, hazard control measures, PPE and posting are submitted and approved by the NASA Ames Nonionizing Radiation Safety Officer and the NASA Ames Nonionizing Radiation Safety Committee prior to performing operations.
   (2) Laser experience forms (DQS-29) for all operators demonstrating competence in laser use are submitted with procedures.
   (3) NASA Ames Laser Safety Training is completed prior to laser operations.

d. The construction contractor shall ensure the following requirements are met for outdoor use of all classes of lasers (Class 1, 2, 3R, 3B, and 4).
   (1) Due to NASA Ames Research Center’s location on an airfield, all Classes of lasers used in an outdoor setting require approval by the FAA, the NASA Ames Laser Safety Officer, the NASA Ames Nonionizing Radiation Safety Committee, and the NASA Ames airfield manager.
   (2) If the laser(s) to be used is a Class 1, 2, or 3R laser, the NASA Ames Laser Safety Officer will generally grant approval based on FAA approval as long as the laser use is in accordance with ANSI Z136.1 as discussed above.
   (3) Use of Class 3B and 4 lasers outdoors will require the same approval process as indoor laser use as well as FAA approval.
   (4) Contact the NASA Ames Airfield Manager for guidance on the FAA approval process. The airfield manager will submit your request to the appropriate FAA field office.
   (5) FAA approval can take up to 45 days for certain laser uses.
27.15.3 Radiofrequency and Microwave Use

The construction contractor shall ensure the following requirements are met for Microwave and Radio Frequency transmitters (not including universal low intensity items such as cell phones, Wi-Fi devices, and walkie-talkies):

a. Ensure the use of transmitters receive authorization from the Nonionizing Radiation Safety Committee and Nonionizing Radiation Safety Officer.

b. NASA Ames personnel and on-site hard badged contractors take online RF safety training. For other construction contractors or users, the Nonionizing Radiation Safety Officer will provide a training handout to be read and signed by all workers and then returned to the Nonionizing Radiation Safety Officer prior to use being authorized.

c. Contact the NASA Ames Nonionizing Radiation Safety Officer for any questions about policies and to obtain the procedure template and forms required to perform the above activities. The Nonionizing Radiation Safety Officer can be reached at 650-604-3979 and the Asst. Nonionizing Radiation Safety Officer at 650-604-4548.

27.16 Gas Protection

Construction Contractors and personnel working with confined spaces shall:

a. Have one or more employees properly trained and experienced in operation and calibration of gas testing equipment and formally qualified as gas inspectors that are on duty during times workers are in confined spaces with the primary function to test for gas and operate testing equipment.

b. Test for gas and oxygen deficiency then document at least every fifteen (15) minutes or more often when character of ground or experience indicates gas may be encountered unless equipment of constant supervisory type with automatic alarm is employed. Special requirements, coordination, and precautions will apply to areas that contain a hazardous atmosphere or, by virtue of their use or physical character may be oxygen deficient.

c. Test for gas before workmen are permitted to enter the excavation after an idle period exceeding thirty (30) minutes.

d. Create permanent record of readings daily, indicating the concentration of gas, point of test, and time of test. Submit copies of the gas test readings to the Contracting Officer at the end of each work day.

e. Follow CFR 1910.146 if work is in a confined space. See Confined Space Entry section of this chapter for additional information.

27.17 Hazardous Materials Use

Construction Contractors and personnel working with hazardous materials on construction sites or facilities maintenance shall:
a. Receive approval from the Contracting Office or their designated representative prior to bringing any hazardous material onto the job site. Allow a minimum of 10 working days for processing of the approval.

b. Follow Ames Procedural Requirements (APR) 8800.3 - Hazardous Materials Management (chapters 3 and 4).

c. Follow the Ames Standard Construction Specification - Environmental Compliance and Pollution Prevention sections for storage, handling or disposal of hazardous materials or hazardous waste.

d. Obtain Material Safety Data Sheets (MSDS) for all chemicals and make them available on the job site at all times for any workers who may be exposed to the chemical.

e. Train employees in proper and safe use of any hazardous materials used at the job site.

f. Provide suitable facilities for quick drenching or flushing of the eyes and body when a person may be exposed to corrosives, irritants or toxic chemicals that can be reached within ten (10) seconds of the immediate work area.

27.18 Electrical

Construction Contractors and personnel working with electrical shall:

a. Certify underground electrical spaces safe for entry before entering to conduct work.

b. De-energize and ground all underground cables to be cut. Positively identify cables to be cut using an impulse cable phasing utility device.

c. Comply with Worksite Procedures (Pre-outage Coordination section) of this chapter.

d. Perform all high voltage cable cutting remotely using hydraulic/piercing cutting tool. When racking in or live switching of circuit breakers, no additional person other than the switch operator will be allowed in the space during the actual operation.

e. Plan so that work near energized parts is minimized to the fullest extent possible. Use of electrical outages clear of any energized electrical sources is the preferred method. When working in energized substations, only qualified electrical workers will be permitted to enter.

f. Require that personnel use personal protective equipment that at a minimum includes electrical hard hat, safety shoes, insulating gloves with leather protective sleeves, fire retarding shirts and coveralls, face shields and safety glasses when working near energized circuits as defined by the NFPA 70E. Insulating blankets, hearing protection and switching suits may also be required depending on the specific job and the Contractor’s AHA.
g. Size portable extension cords in accordance with manufacturer ratings for the tool to be powered and protect from damage.

h. Immediately remove from service all damaged extension cords.

i. Ensure that portable extension cords meet the requirements of NFPA 70E and OSHA electrical standards.

j. Provide GFCI (ground fault circuit interrupter) for wiring used on construction site in accordance with 29 CFR 1926.404(b) (1).

k. Provide GFCI (ground fault circuit interrupter) protection for electric powered hand tools.


m. Follow the requirements of Ames Health and Safety Procedural Requirements: Chapter 11 - Electrical Safety. The most stringent requirements govern when inconsistencies arise.

n. Locate electrical utilities, see section 27.28.

27.19 Scaffolding

Construction Contractors and personnel working with scaffolding shall:


b. Ensure that daily documented inspections are performed by a qualified employee.

c. Provide employees with a safe means of access to the work area on the scaffold.

d. Prohibit climbing of any scaffold braces or supports not specifically designed for access.

e. Access scaffold platforms greater than twenty (20) feet maximum in height by use of a scaffold stair system with an adequate gate.

f. Ensure that employees are qualified to perform scaffold erection and dismantling.

g. Use scaffolding with the capability of supporting at least four (4) times the maximum intended load and are not overloaded with materials.

h. Ensure that required fall protection is used and the fall protection plan is followed.

i. Ensure that stationary scaffolds are attached to structural building components to safeguard against tipping forward or backward.

j. Prohibit use of side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material.
k. Ensure the first tie-in shall be at the height equal to 4 times the width of the smallest dimension of the scaffold base.

l. Ensure that supported scaffolds are set on base plates, mud sills, or other adequate firm foundation.

m. Ensure that scaffold or work platform erectors have fall protection during the erection and dismantling of scaffolding or work platforms that are more than six (6) feet. See Ames Health and Safety Procedural Requirements: Chapter 40 - Fall Protection Program.

n. Follow the training requirements in Ames Health & Safety Procedural Requirements: Chapter 40 - Fall Protection Program.

27.20 Lifting Devices and Material Handling Equipment

Construction Contractors shall:

a. Notify the Contracting Officer, COR or Project Manager fifteen (15) business days in advance of any cranes entering the center so that notifications can be made to the Ames Lifting Device Equipment Manager (LDEM).

b. Obtain a copy of the lift plan requirements package at the Preconstruction Conference or by contacting the LDEM, 650-604-5162, Building N213, room 253.

c. Submit lift plan to the LDEM, 650-604-5162, Building N213, room 253, for coordination and authorization five (5) business days prior to scheduled lift.

d. Comply with the crane manufacturer's specifications and limitations for erection and operation of cranes and hoists used in support of the work. Perform erection under the supervision of a designated person (as defined in ASME B30.5).

e. Perform all testing in accordance with the manufacturer's recommended procedures.


g. Follow the requirements of ASME B30.5 or ASME B30.22 as applicable when operating in the vicinity of overhead transmission lines.

h. Prove that using any other access to the work location would provide a greater hazard to the workers or is impossible when crane suspend personnel work platforms (baskets) are used. Do not lift personnel with a line hoist or friction crane.

i. Inspect, maintain, and recharge portable fire extinguishers as specified in NFPA 10, Standard for Portable Fire Extinguishers.

j. Keep clear of loads about to be lifted and of suspended loads. Operator is to remain at the controls for all suspended loads.

k. Use cribbing when performing lifts on outriggers.

l. Position the crane hook/block directly over the load. Side loading of the crane is prohibited.
m. Position a physical barricade to prevent personnel from entering the counterweight swing (tail swing) area of the crane.

n. Provide (and always make available to personnel) the certification records which include the date of inspection, signature of the person performing the inspection, and the serial number or other identifier of the crane that was inspected. Document using a checklist.

o. Provide (and always make available to personnel) written reports listing the load test procedures used along with any repairs or alterations performed on the crane.

p. Certify that all crane operators have been trained in proper use of all safety devices. Maintain proof of operator qualifications and the approved lift plan on the project site for review.

q. Take steps to ensure that wind speed does not contribute to loss of control of the load during lifting operations. Prior to conducting lifting operations set a maximum wind speed not to exceed 23 miles per hour at which a crane can be safely operated based on the equipment being used, the load being lifted, experience of operators and riggers, and hazards on the work site. Include the maximum wind speed determination as part of the activity hazard analysis plan for that operation.


s. Maintain manufacturer's specifications or owner's manual for the equipment on the project site and ensure personnel have reviewed additional safety precautions or requirements that are not identified by OSHA. Incorporate such additional safety precautions or requirements into the project AHA's.

t. Ensure that material handling equipment such as forklifts are not be modified with work platform attachments for supporting employees unless specifically allowed in the manufacturer's printed operating instructions.

u. Ensure that the use of hooks on equipment for lifting of material are used in accordance with manufacturer's printed operating instructions.

v. Ensure that operators of forklifts or power industrial trucks are licensed in accordance with OSHA.

### 27.21 Pressure Systems

Follow the requirements of Ames Health and Safety Procedural Requirements: Chapter 10 - Pressure Systems Safety. The most stringent requirements govern when inconsistencies arise. Locate any pressure systems as per section 27.28.

### 27.22 Asbestos and Lead

Follow the requirements of Ames Health and Safety Procedural Requirements: Chapter 30 - Asbestos Management Plan, Chapter 35 Lead Management Plan. The most stringent requirements govern when inconsistencies arise.

### 27.23 Fall Protection
Follow the requirements of Ames Health and Safety Procedural Requirements: Chapter 40 - Fall Protection Program. The most stringent requirements govern when inconsistencies arise.

27.24 Safety Lanes, Barricaded, Hazard Labeling and Posting

Follow the requirements of Ames Health and Safety Procedural Requirements: Chapter 42 - Safety Lanes, Barricades, Hazard Labeling and Posting. The most stringent requirements govern when inconsistencies arise.

27.25 Portable Ladder Safety

Follow the requirements of Ames Health and Safety Procedural Requirements: Chapter 40 - Fall Protection Program. The most stringent requirements govern when inconsistencies arise.

27.26 Portable Hand and Power Tools

Follow the requirements of Ames Health and Safety Procedural Requirements: Chapter 48 - Portable Hand and Power Tools. The most stringent requirements govern when inconsistencies arise.

27.27 Use of Explosives

Explosives shall not be used or brought to the project site, except as provided in this section.

27.27.1 Powder-Actuated Tools

a. Construction Contractors and personnel working with powder-actuated tools shall:

1. Be thoroughly trained in the particular tool used before entering work site and exercise extreme care at all times.
2. Ensure that tool use complies with Federal and State OSHA regulations.
3. Possess a certificate of training issued by Hilti or other authorized manufacturer of the tool being used and be able to produce certificate upon request. Submit certificate to the Ames Construction Safety Specialist prior to work.
4. Obtain a Hot Work permit when using powder-actuated tools. See Hot Work section of this chapter for additional information.
5. Use powder-actuated tools in accordance to the manufacturer's specifications and safety precautions.
6. Wear appropriate PPE such as safety glasses or goggles, safety shoes and hearing protection.
7. Provide notice to all occupants when used in laboratory or office areas before the tool is fired. Persons in adjacent work places may be startled or even injure themselves when unexpectedly exposed to the noise generated by a powder-actuated tool.
8. Perform testing of the tool each day before loading to verify safety devices are in proper working condition. Use a method of testing in accordance with the manufacturer’s recommended procedure. Immediately remove from service and tag any tool found not in proper working order, or that develops a defect during use, until properly repaired.

9. Load tool just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at an employee. Keep hands clear of the open barrel end.

10. Secure loaded tools when left unattended.

11. Be used with the correct shield, guard, or attachment recommended by the manufacturer.

12. Ensure that powder-actuated tools meet all applicable requirements of American National Standards Institute (ANSI) ANSI/ASSE A10.3-2006, Safety Requirements for powder-actuated fastening systems.

13. Obtain the Material Safety Data Sheet (MSDS) for the cartridges and keep with the equipment on site.

14. Only bring cartridges for one (1) day of work onto Ames property. Remove unused cartridges from Ames property at the end of each day.

b. Construction Contractors and personnel working with powder-actuated tools shall not:

1. Drive fasteners into very hard or brittle materials including, but not limited to: cast iron, glazed tile, surface-hardened steel, glass block, face brick, or hollow tile.

2. Drive fasteners into materials easily penetrated unless such materials are backed by a substance that will prevent the pin or fastener from passing completely through and creating a flying missile hazard on the other side.

3. Drive a fastener into a spalled area caused by an unsatisfactory fastening.

4. Use tool or drive fasteners in an explosive or flammable atmosphere.

27.28 Location of Utilities

a. Sufficient clearance shall be provided to prevent the unexpected contact with any utilities (electrical, natural gas, pressured water, air, or other energies above Federal OSHA hazard levels) when penetrating the ground or any permanently installed surface (walls, ceiling, or floors) by:

1. Locating any subsurface utility (e.g., electrical, gas, high pressure air, steam, water) that may be affected by the drilling, penetration, demolition, cutting or excavation

a) Performing a subsurface site survey prior to starting excavations six inches or more in depth

b) Performing a subsurface site survey for penetrations of greater than 2 inches in walls, ceilings, and floors

2. Only allowing qualified persons using appropriate scanning instruments to conduct the survey
3. Clearly marking surfaces with the survey findings
4. Submitting a written survey report to the NASA Ames Construction Permit Office
5. Implementing appropriate controls to ensure the work can be done safely when utilities are present

b. Any location methodology using radiation such as radiography or the use of density gauges must be done according to section 27.15.1, Radioactive Materials and Radiation Producing Equipment in this chapter.

27.29 Personnel Protective Equipment (PPE)

a. Personal Protective Equipment (PPE) used on the construction worksite shall be inspected prior to use to ensure it is in good shape.

b. The minimum proper PPE on the jobsite that’s not otherwise covered in another section of this chapter shall:
   (1) Be long pants and shirts with sleeves.
   (2) Not be loose fitting clothing or jewelry that may get caught in tools or machinery.
   (3) Be shoes that protect the feet such as steel or composite toed boots.
   (4) Be a minimum of ANSI/ASSE Z87 safety glasses with side shields.
   (5) Be a face shield and safety glasses that works with a hard hat when grinding or other operations that require face protection.
   (6) Be goggles that are worn when greater eye protection is needed.
   (7) Be the correct lens for the welding job.
   (8) Be ear plugs or ear muffs when grinding, using impact hammers or other equipment that create high noise levels (above 85 dBA).
   (9) Be hard hats that comply with ANSI/ASSE Z89.1.
   (10) Be hard hats that comply with ANSI/ASSE Z89.2 when workers that may be exposed to high voltage or can be burned. See section 27.18 for additional requirements for working with electrical.
   (11) Be the correct welding helmets that protect the head and eyes from injury.
   (12) Be reflective apparel such as jackets, shirts, or vests shall that comply with ANSI/ISEA 107, Class 2 requirements.
   (13) Not be nylon vests when performing hot work such as welding, gas or plasma cutting.
   (14) Be heavy boots, chainsaw face guard, leather gloves and protective leg chaps when using chain saws.
   (15) Be the correct tree climbing equipment when workers are climbing trees.
   (16) Be the appropriate leather gloves while welding, handling building materials and moving equipment to prevent cuts, abrasions and burns.
   (17) Be the correct gloves (such as nitrile gloves) when handling chemicals.
Appendix A: Definitions

A1. Activity Hazard Analysis: Defines the activities being performed and identifies the work sequences, the specific anticipated hazards, site conditions, equipment, materials and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk. The AHA is similar to a Job Hazard Analysis however it is based on activities.

A2. Code of Safe Practices: This is a document required by CAL/OSHA as part of the employer’s Injury and Illness Prevention Program (IIPP). It is a set of work site rules that stipulate how to perform job duties safely and to keep the work site safe. The following are selected requirements: The employer must develop and adopt a written Code of Safe Practices specific to the employer’s operations. Title 8 CCR Chapter 4, 1509(b) It must be posted at each job site office or be readily available at the job site. 1509(c) Workers, when first hired, must be directed to read the Code of Safe Practices. 1510(a) The code shall contain language pertinent to the relevant parts of the operation that would affect the employee’s safety.

A3. Competent Person: An individual who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them [29 CFR 1926.32(f)]. By way of training and/or experience, a competent person is knowledgeable of applicable standards, is capable of identifying workplace hazards relating to the specific operation, and has the authority to correct them. Some standards add additional specific requirements that must be met by the competent person.

A4. Construction Contractor: A business entity (i.e., person, corporation, partnership, joint venture, etc.) which has satisfied the contracting officer that they qualify as one of the following: They own, operate, or maintain a place of business regularly engaged in the construction, alteration, or repair of buildings, structures, communication facilities, or other engineering projects, including furnishing and installing of the necessary equipment; or If currently entering into a construction activity, they have made all necessary prior arrangements for personnel, construction equipment, and required licenses to perform construction work.

A5. Construction Permit: The Construction Permit Program is a systematic and easily referenced method for issuing Construction Work Permits at Ames Research Center. Construction permits shall be obtained in accordance with APR 8829.1 and APD 8829.1.

A6. Construction Work: Construction work, as defined by OSHA is any construction, alteration, and/or repair, including painting and decorating of a structure. (29 CFR 1910.12(b)). In order for work to be construction work, the employer need not itself be a construction company. Further, construction work is not limited to new construction; it may include the repair of existing facilities. The replacement of structures and their
components is also considered construction work (See OSHA Standard Interpretation 08/11/94 - Construction vs. Maintenance).

**A7. Contracting Officer:** Any person who, by appointment in accordance with procedures prescribed by the Federal Acquisition Regulations and NASA FAR Supplement, is currently a contracting officer with the authority to enter into contracts, administer contracts, and make determinations and findings with respect thereto or with any part of such authority.

**A8. Contracting Officer's Representative:** A person exercising authority and responsibility delegated by the CO. This individual represents the CO in the daily surveillance of the contractor, and provides overall technical management of the contract.

**A9. Demolition:** Any operation that involves the intentional burning, wrecking, or taking out of any load-supporting structural members of a facility. Demolition also refers to the separation of a structure from its foundation prior to relocation.

**A10. Experienced Modification Rate:** Factors based on claims paid for Workers Compensation Insurance for the state.

**A11. Imminent Danger:** The Occupational Safety and Health Act of 1970, section 13(a) defines imminent danger as ".....any conditions or practices in any place of employment which are such that a danger exists which could reasonably be expected to cause death or serious physical harm immediately or before the imminence of such danger can be eliminated through the enforcement procedures".

**A12. Maintenance:** means keeping equipment or a structure in proper condition through routine, scheduled or anticipated measures without having to significantly alter the structure or equipment in the process as defined by OSHA. For equipment, this generally means keeping the equipment working properly by taking steps to prevent its failure or degradation.

**A13. NASA Ames Fire Department:** The onsite fire department that provides first responder support in case of fire or related emergencies. The fire department supports fire-related emergencies at construction sites and hot work concerns.

**A14. Repair:** Facility work required to restore a facility or component thereof, including collateral equipment, to a condition substantially equivalent to its originally intended and designed capacity, efficiency, or capability. It includes the substantially equivalent replacement of utility systems and collateral equipment necessitated by incipient or actual breakdown. Repair work is considered construction work.

**A15. Site Safety and Health Officer:** A Qualified and Competent person to monitor safety on the jobsite as per the requirements stipulated by this chapter and is appointed by the contractor.
A16. **Unsafe or Unhealthy Condition**: A hazardous condition that poses or has the potential to pose a risk to the health and safety of personnel or the public, and/or damaging to equipment, machinery, or the environment.
Appendix B: Acronyms

B1. AHA - Activity Hazard Analysis
B2. ARC – Ames Research Center
B3. CO - Contracting Officer
B4. COR - Contracting Officer's Representative
B5. EMR – Experience Modification Rate
B6. JHA – Job Hazard Analysis
B7. NCCCO - National Commission for the Certification of Crane Operators
B8. OSHA – Occupational Safety and Health Administration
B9. PPE – Personal Protective Equipment
B10. SSHO – Site Safety and Health Officer
### Activity Hazard Analysis Worksheet

<table>
<thead>
<tr>
<th>Sequence of Steps or Activities</th>
<th>Hazards or Potential for Mishaps</th>
<th>Preventive Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demolition</td>
<td>Head, feet, hearing and respiratory protection</td>
<td>Wear personal protective equipment: hard hat, safety shoes, ear plugs, gloves that protect hands from sharp edges &amp; face/dust masks.</td>
</tr>
<tr>
<td>Electric shock</td>
<td></td>
<td>Survey the work area for utilities that need to be turned off. Arrange pre-outage coordination. Verify that electrical circuit has been de-energized before workers proceed. Use lockout/tagout procedures. Plug all power tools in to GFCI protected circuit.</td>
</tr>
<tr>
<td>Exposure to silica dust</td>
<td></td>
<td>Use wet method while drilling, breaking or crushing concrete when dust is present. Wear N95 rated dust mask. Wear safety glasses to protect eyes.</td>
</tr>
<tr>
<td>Falling objects</td>
<td></td>
<td>Ensure barricades and signage is in place. Do not entry into falling object zone unless all work has been stopped and area is safe to enter. Notify workers in adjacent buildings of demolition activity and evacuate if building debris are likely to fall onto structure. Conduct safety tailgate meeting on falling object hazards prior to start of work.</td>
</tr>
<tr>
<td>Falling from heights</td>
<td></td>
<td>Follow approved written Fall Protection plan for the project or list specific equipment and Fall Protection required for the hazard.</td>
</tr>
</tbody>
</table>

Copy 1 – QH Safety, Building 223  
Copy 2 – Post at job site  
Copy 3 – File for your records
Appendix D: Hot Work Permit

NASA AMES FIRE PREVENTION
HOT WORK PERMIT

THIS HOT WORK PERMIT IS REQUIRED FOR ANY TEMPORARY OPERATIONS OR TASKS INVOLVING OPEN FLAMES AND/OR SPARKS SUCH AS BRAZING, CUTTING, GRINDING, FLAME SOLDERING, PIPE THAWING AND TORCH-APPLIED ROOFING AND SEAM WELDING. IT ALSO APPLIES TO THE USE OF ORDINARY ELECTRICAL EQUIPMENT IN A HAZARDOUS (CLASSIFIED) LOCATION.

***REPORT ALL FIRES! FROM LANDLINE, 9-1-1 (CELL) 604-5555***

<table>
<thead>
<tr>
<th>Permit #</th>
<th>Issued: / /</th>
</tr>
</thead>
</table>

REQUESTOR INFORMATION

NASA □ Contractor □ Name: __________________________

Code/Company: __________________________

Cell Phone #: __________________________

Building/Location: __________________________

Rm #: __________________________

Type of Hot Work (Check all that apply):

□ ARC/Gas Welding □ Soldering/Brazing □ Cutting Torch □ Grinding

□ Torch-on Roofing □ Seam Welding (no open-flame) □ Other (specify): __________________________

For Fire Prevention Office Use Only

I verify the hot work location has been inspected, operator qualifications verified, and precautions listed have been followed. The operation described above is hereby authorized.

PRINT NAME: __________________________

SIGNATURE: __________________________

INSTRUCTIONS TO HOT WORK SUPERVISOR

"ALL HOT WORK OPERATIONS SHALL BE IN COMPLIANCE WITH CURRENT CALIFORNIA FIRE CODE CHAPTER 35, NFPA 51B, AND OSHA STD 1910 Subpart Q."

1. Verify precautions listed on the BACK of form (or do not proceed with work).
2. Post approved permit (Yellow copy) at job site during the hot work operations.
3. Return completed hot work permit (Yellow copy) to the Fire Prevention Office (Bldg 158, Rm. 202) when project is finished.
4. "FOR EXTENSIONS: Call 650-604-2024/3112"

FIRE WATCH SIGNOFF: Work area and all adjacent areas where sparks or heat might have spread were inspected during the fire watch period and were found fire safe.

PRINT NAME: __________________________

INITIALS: __________________________

FINAL CHECKUP (HOT WORK SUPERVISOR) – Minimum 30 minutes after Hot Work. Work area was monitored for specified period of time following hot work and found fire safe.

PRINT NAME: __________________________

SIGNATURE: __________________________

HWP Form Rev 3, Dec 2013  White Copy: FPO Files  Yellow Copy: Posted at Site
# Appendix E: Construction Safety Inspection Form

## Construction Safety Inspection Form

<table>
<thead>
<tr>
<th>Item</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Fixed Date</th>
<th>Item</th>
<th>Yes</th>
<th>No</th>
<th>N/A</th>
<th>Fixed Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Program Administration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Material Storage/Handling</strong></td>
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<tr>
<td>OSHA Posting</td>
<td></td>
<td></td>
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<td></td>
<td>Material is properly stored/stacked</td>
<td></td>
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<tr>
<td>Emergency numbers/contacts posted</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dust protection adequate</td>
<td></td>
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<tr>
<td>Hazard Communication Program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Loads lifted correctly</td>
<td></td>
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<tr>
<td>Daily/Weekly safety meetings held</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Excavations &amp; Shoring</td>
<td></td>
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<tr>
<td>Housekeeping/demolition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Shoring proper for soil &amp; depth</td>
<td></td>
<td></td>
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<tr>
<td>Work area orderly</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Adjacent structures properly shored</td>
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<td></td>
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<tr>
<td>Adequate lighting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Necessary ladders provided</td>
<td></td>
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<tr>
<td>Hand washing/bathroom facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Excavation barricaded</td>
<td></td>
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<tr>
<td>Passage, entry &amp; walkways clear</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Spill is set back at least 2 feet</td>
<td></td>
<td></td>
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<tr>
<td>Clean eating/drinking area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Equipment away from edge</td>
<td></td>
<td></td>
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<tr>
<td><strong>Fire Prevention</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Equipment ramps adequate</td>
<td></td>
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<tr>
<td>Fire extinguishers available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ladders</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Correct extinguishers for job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ladders in good condition</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>No smoking posted and enforced</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Side rails extend 36” above landing</td>
<td></td>
<td></td>
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<tr>
<td><strong>Electrical/Utility</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Proper for job &amp; secure</td>
<td></td>
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<tr>
<td>Electrical hazards posted</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ladders fully open when in use</td>
<td></td>
<td></td>
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<tr>
<td>Drop cords protected</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Scaffolding</strong></td>
<td></td>
<td></td>
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<tr>
<td>Underground electrical lines staked</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Equipment in good condition</td>
<td></td>
<td></td>
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<tr>
<td>Lockout procedures utilized</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Scaffold is tied to structure</td>
<td></td>
<td></td>
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<tr>
<td>Access to breaker box clear</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Guardrails, top, mid, toe boards in place</td>
<td></td>
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<tr>
<td>Underground gas lines staked</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Connections sound &amp; secure</td>
<td></td>
<td></td>
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<tr>
<td><strong>Hand &amp; Power Tools</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Plumbing cleats in place</strong></td>
<td></td>
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<tr>
<td>Hand tools in good working condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Worker protected from falling objects</td>
<td></td>
<td></td>
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<tr>
<td>Cords in good condition</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Welding &amp; Cutting</strong></td>
<td></td>
<td></td>
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<tr>
<td>All mechanical safeguards in place</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Screen &amp; shields in place</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Proper tools utilized for each job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Electrical equipment grounded</td>
<td></td>
<td></td>
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<tr>
<td>Tools grounded or double insulated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Compressed gas cylinders secure/upright</td>
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<tr>
<td><strong>Heavy Equipment</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Proper personal protection utilized</strong></td>
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<tr>
<td>Operation manuals available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Fire extinguishers immediately available</td>
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<tr>
<td>Brakes, lights, signals &amp; alarms operative</td>
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<td></td>
<td></td>
<td></td>
<td>Welding cables in good condition</td>
<td></td>
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<tr>
<td>Wheels checked when necessary</td>
<td></td>
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<td></td>
<td><strong>Personal Protective Equipment</strong></td>
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<tr>
<td>Seat belts worn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hardhats worn</td>
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<tr>
<td>Daily inspections documented</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Gloves available &amp; used</strong></td>
<td></td>
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<tr>
<td><strong>Barricades &amp; Fencing</strong></td>
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<td></td>
<td></td>
<td><strong>Steel toe footwear</strong></td>
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<tr>
<td>Site fenced</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Eye protection utilized</td>
<td></td>
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<tr>
<td>Roadways &amp; sidewalks fenced</td>
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<td></td>
<td><strong>Ear protection utilized</strong></td>
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<tr>
<td>Floor openings plated or barricaded</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Safety belts &amp; lanyards utilized</td>
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<tr>
<td>Access control</td>
<td></td>
<td></td>
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<td></td>
<td>Respirators &amp; masks utilized</td>
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</tbody>
</table>
Appendix F: Unsafe Condition Noncompliance Notice

Date:

To: (COR, Contracting Officer and the Safety Office Manager)

From: (Construction Safety Specialist)

Subject: Unsafe Condition Noncompliance Notice

Re: (Identify Building number, Project Title)

The construction contractor currently working at (Building No.) has failed to resolve safety deficiencies as requested by our office. As a member of NASA's Safety Management Team for this project, please ensure that measures are taken immediately to correct the deficiencies.

(Description of job-site deficiencies).

Should you have any questions or concerns, please contact me at (extension no.).

(Name of Construction Safety Specialist)
Appendix G: Stop Work Order Notice

Date:

To: (COR, Contracting Officer and the Safety Office Manager)

From: (Construction Safety Specialist)

Subject: Stop Work Order Notice

Re: (Identify Building number, Project Title)

A safety inspection was conducted at (Building No.) and has identified immediate concerns for people's safety, health, and/or the environment. The construction contractor currently working at (Building No.) has failed to take prompt corrective action of serious unsafe conditions. Please invoke the Suspension of Work provision of the contract and ensure that measures are taken immediately to correct the deficiencies. The Safety Division will not authorize work to resume until appropriate abatement measures are taken.

(Description of unsafe condition)

Should you have any questions or concerns, please contact me at (extension no.).

(Name of Construction Safety Specialist)